

## **Molecular Biology MEDC 2151**

**Objectives:** The fast pace of modern molecular genetics research is driven by major challenges in medicine, agriculture, and industry; and, ultimately, by intellectual curiosity. There is intense public interest in the human genome project and genetic engineering, due in part to fascination with how our own genes influence our lives. The primary objective of this course is to provide students with an advanced understanding and appreciation of current topics in molecular genetics, while developing skills in critical thinking and written expression. A central theme of the course will be the continuum of biological understanding, starting with basic properties of genes and genomes and extending to the complex, hierarchical interactions fundamental to living organisms. A comprehensive picture of the many ways molecular genetics is being applied to the analysis of complex systems will be developed, including advances that reveal fundamental features of gene regulation during cell growth and differentiation, and in response to a changing environment, as well as developments that are more related to commercial and medical applications. Recent advances in technology, the process and thrill of discovery, and ethical considerations in molecular genetics research will be emphasized.

**Grading:** The final grade will be based on one in-class exam, one written assignment, and a final examination. Exam I will be worth 30%, the written assignment worth 20% and the final examination worth 50% of the course grade.

### **Lecture Topics**

<b><u>Lecture number</u></b>	<b><u>Lecture topic</u></b>	<b><u>Chapter</u></b>
1	The structure of DNA	2
2	Genome organization: From nucleotides to chromatin	3
3	The versatility of RNA	4
4	From gene to protein: The genetic code and protein structure	5
5	DNA replication and Telomere maintenance	6
6		
7		
8	Transcription	10, 11
9	RNA processing and post-transcriptional gene regulation	13
10	Mechanisms of translation	14
11	Genome analysis	16
12	Medical molecular biology: Cancer	17
13	Medical molecular biology: Gene therapy	

**Parts of chapter 8 and 9 will be covered in the laboratory**